Samira Malek

Curriculum Vitae

Department of Computer Science and Engineering
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Education

2023–Present **PhD of Computer Science**, *Pennsylvania State University*, Pennsylvania, USA, *GPA – 3.84 out of 4*.

2018–2020 **Master of Electrical Engineerings, Communications System**, *Sharif University of Technology*, Tehran, Iran, *GPA – 3.61 out of 4 (16.97/20)*.
Ranked as **1st** university in Iran based on QS Ranking.

2013–2018 **Bachelor of Electrical Engineerings, Communications**, *Sharif University of Technology*, Tehran, Iran, *GPA – 3.37 out of 4 (16.37/20)*.

Work Experience

2022 **Senior Data Scientist**, *Customer Relationship Management (CRM) Department*, Snowa Company, Tehran, Iran..

- Customers Clustering with unsupervised algorithms such as Kmeans in Python.
- Finding Families among all customers with graph algorithms in SQL.
- Designing Data Warehouse.

Research Interests

- Machine Learning
- Deep Learning
- Statistical Models
- Optimization

Honors and Awards

2022 Awarded the College of Engineering Dean's Office scholarship at **Pennsylvania State University**.

2018 **Ranked 29th** in the Iran Nation-wide University Entrance Exam Known as Konkoor for M.Sc degree, among +40,000 test-takers.

2013 **Ranked 40th** in the Iran Nation-wide University Entrance Exam Known as Konkoor for B.Sc degree, among +250,000 test-takers.

2012 **Silver Medalist** of 30th Iran National Mathematical Olympiad.

2009 Become a member of **National Organization for Development of Exceptional Talents (NODET)**.

Thesis

Master Thesis

Title **Using Deep Neural Networks for Decoding Linear Codes**

Supervisors Prof. Amini & Prof. Salehkaleybar

Description Decoding is treated as a classification problem at this approach, which is doomed by the curse of high dimensionality of training data. Afterwards, I used the belief propagation algorithm to design neural networks based on factor graph of codes which helps to solve the high dimensionality problem of data and optimize decoding algorithms. The proposed algorithms both improve the performance in terms of bit error rate and reduce the computational complexity of decoding with respect to previous works.

Bachelor Thesis

Title **Diagnosis of Eye Diseases by Using Recorded Signals from The Neural Retina**

Supervisor Prof. Hajipour

Description I explored the physiology of the Neural Retina and investigated how neurons would respond to different stimuli in experiments. I worked on recorded MicroElectroRetinoGram (MERG) signal from mice. Afterwards, I wrote a code that could denoise a recorded signal and distinguish a healthy retina from unhealthy.

Publications

Published **Samira Malek**, Saber Salehkaleybar, Arash Amini, **"Multi Variable-layer Neural Networks for Decoding Linear Codes"**, Iran Workshop on Communication and Information Theory (IWCIT), IEEE, 2020.

Preprint **Samira Malek**, Saber Salehkaleybar, Arash Amini,**"A Deep Neural Network Architecture for Decoding Linear Codes Based on the Parity Check Matrix"** to be submitted (it's available here).

Selected Courses

Pennsylvania State University:

- Distributed Optimization (A)
- Large Scale Machine Learning
- Deep Learning for NLP (A-)
- Algorithm Design and Analysis

Sharif University of Technology:

- AI and Biological Computation (A+)
- Signal & System (A)
- Speech Processing (A+)
- Information hiding (A+)
- Engineering Probability and Statistics (A)
- Numerical Computation (A+)
- Digital Signal Processing(II) (A)
- Digital Communication (A)

Selected Academic Projects

Spring 2023 **Implementation of Stochastic Gradient Descent Ascent (SGDA) & Stochastic Compositional gradient (SCSC)** for MinMax optimization in Python, as a project of *Distributed Optimizatio* course, Under supervision of Prof. Ying Sun.

Spring 2023 **Training GPT by Prompting for multi-hop question answering task on HotPotQA** in Python, as a project of *Deep Learning for NLP*, Under supervision of Prof. Rui Zhang.

Spring 2020 **Implementation of Viterbi algorithm & Reduced Complexity Viterbi Sequence Detector** in MATLAB, as a project of *Advanced Communication System* course, Under supervision of Prof. NasiriKenari.

Spring 2019 **Implementation of a FeedForward and a Recurrent Neural Networks for Pitch Tracking in Noisy Speech** in Keras**, Extraction pitch contours by SIFT, HPS, and AMDF algorithms** in MATLAB as projects of *Speech Processing* course, Under supervision of Prof. Ghaemmaghami.

Fall 2018 **Implementation of BFGS, Steepest Descent and Newton Algorithm** in MATLAB, as projects of *Numerical Optimization Methods* course, Under supervision of Prof. BabaieZadeh.

Fall 2018 **Recovering an image by IMAT and OMP algorithms, Reconstruction of 1-D and 2-D Signals by SDFT and RS Methods** in MathCad, as projects of *Digital Signal Processing(II)* course, Under supervision of Prof. Marvasti.

Spring 2016 **Design a Neural Network for Classification Right-handed and Left-handed Typing, with EEG Signal** in MATLAB, as a project of *AI & Biological Computation* course, Under supervision of Prof. Hajipour.

Fall 2013 **Implementation of a Semi-iudo Graphical Game** in C Language, as a project of *Introduction to Programming* course, Under supervision of Prof. TaherKhani.

Teaching Experiences

Fall 2023 Teaching Assistant for **Discrete Mathematics** at Pennsylvania State University.

Spring 2023 Teaching Assistant for **Discrete Mathematics** at Pennsylvania State University.

Fall 2019 Teaching Assistant for **Signal & System** at Sharif Univesity of Technology.

Spring 2019 Teaching Assistant for **Stochastic Random Process** at Sharif University of Technology.

Spring 2019 Teaching Assistant & MATLAB Teaching for **Engineering Mathematics** at Sharif University of Technology.

2017–2018 Design **Mock Test** of the Iran Nation-wide University Entrance Exam Known as Konkoor for B.Sc degree in Kanoon Institution, which has the most participants in Iran (more than +20,000 students every year).

2014–2015 Teaching **Mathematics** at Farzanegan High school (NODET), Preparing students for Iran National Mathematical Olympiad.

Computer Skills

Languages Python , MATLAB, SQL, C/C++, LaTeX, HTML

Softwares Anaconda, Microsoft Power BI, Misrosoft SQL Server Management

Languages

English **TOEFL iBT: 95**
GRE General: 317, Writing: 3.5–November 2021

Native • Persian • Azerbaijani

Reference

References available upon request.